

AMENDMENTS TO THE CLAIMS

Claim 1 (Currently Amended) A surface acoustic wave resonator comprising:

a piezoelectric substrate;

an inter-digital transducer formed of two electrodes including a plurality of electrode fingers disposed on a surface of the piezoelectric substrate, the inter-digital transducer including a gradation region located at opposing ends thereof; and

reflectors disposed near ~~the opposing~~ opposite ends of the inter-digital transducer,

wherein ~~the inter-digital transducer has a gradation region where~~ includes electrode fingers of the plurality of electrode fingers, the electrode fingers included in the gradation region having an electrode finger pitch that gradually changes,

wherein, at each opposing end of the inter-digital transducer and within the gradation region, the an electrode finger pitch of 5 to 30 electrode fingers of the the plurality of plurality of electrode fingers at the opposite ends is different from an the electrode finger pitch of electrode fingers of the plurality of electrode fingers located near a center of the inter-digital transducer,

wherein regarding the electrode finger pitches in the gradation region, the electrode finger pitch of the electrode fingers of the plurality of electrode fingers located at the a farthest end, which is one end of the gradation region and an one of the opposing ends end of the inter-digital transducer, is set to be 1 through 1% to 5 % smaller than the electrode finger pitch of the electrode fingers located near the center of the inter-digital transducer, and

wherein, within the gradation region, the electrode finger pitch is pitches are sequentially varied from the electrode finger pitch of an electrode finger of the plurality of electrode fingers

located at the farthest end to gradually approach the electrode finger pitch of the electrode fingers located near the center of the inter-digital transducer, and is sequentially varied from the electrode finger pitch of an electrode finger of the plurality of electrode fingers located at an end of the inter-digital transducer that is opposite from the farthest end to gradually approach the electrode finger pitch of the electrode fingers located near the center of the inter-digital transducer in the range from the electrode finger at the farthest end to the electrode finger lying at the other end of the gradation region and on the center side of the inter-digital transducer.

Claim 2 (Currently Amended) The surface acoustic wave resonator of claim 1,
wherein ~~the~~ a number of the electrode fingers in the gradation region is set to depend-
~~dependently~~ on a set value of the electrode finger pitch of the electrode finger-fingers at the
farthest end ~~that is one end of the gradation region.~~

Claim 3 (Cancelled)

Claim 4 (Currently Amended) A ladder-type surface acoustic wave filter comprising:
a piezoelectric substrate; and
series resonators and parallel resonators that are interconnected on the surface of the
piezoelectric substrate,
wherein one or more of the series resonators is the surface acoustic wave resonator of
claim 1 ~~is used as one or more of the series resonators.~~

Claim 5 (Currently Amended) A ladder-type surface acoustic wave filter comprising:

a piezoelectric substrate; and

series resonators and parallel resonators that are interconnected on the surface of the piezoelectric substrate,

wherein one or more of the series resonators and one or more of the parallel resonators ~~are the surface acoustic wave resonator of claim 1 is used as one or more of the series resonators and one or more of the parallel resonators.~~

Claim 6 (Currently Amended) A surface acoustic wave filter comprising:

a piezoelectric substrate;

a plurality of inter-digital transducers disposed closely on an identical surface acoustic wave propagation path on the piezoelectric substrate; and

reflectors disposed on opposite ends of ~~the~~ a structure including ~~having~~ the plurality of inter-digital transducers,

wherein at least one of the plurality of inter-digital transducers is a first inter-digital transducer connected to a signal path in series, and at least one of the plurality of inter-digital transducers is a second inter-digital transducer connected between the signal path and a ground,

wherein the first inter-digital transducer is formed of two electrodes including a plurality of electrode fingers, and the first inter-digital transducer includes ~~has~~ a gradation region located at opposing ends thereof,

wherein the gradation region includes electrode fingers of the plurality of electrode fingers, the electrode fingers included in the gradation region having ~~where~~ an electrode finger

pitch that gradually changes of the plurality,

wherein, at each opposing end of the first inter-digital transducer and within the gradation region, the electrode finger pitch of 5 to 30 electrode fingers of the plurality of electrode fingers-
at opposite ends is different from an the electrode finger pitch of electrode fingers of the plurality
of electrode fingers located near a center of the first inter-digital transducer,

wherein regarding the electrode finger pitches in the gradation region, the electrode finger
pitch of the electrode fingers of the plurality of electrode fingers located at the a farthest end,
which is one end of the gradation region and an one of the opposing ends end of the first inter-
digital transducer, is set to be 1 through 1% to 5 % smaller than the electrode finger pitch of the
electrode fingers located near the center of the first inter-digital transducer, and

wherein, within the gradation region, the electrode finger pitch is pitches are sequentially
varied from the electrode finger pitch of an electrode finger of the plurality of electrode fingers
located at the farthest end to gradually approach the electrode finger pitch of the electrode
fingers located near the center of the first inter-digital transducer, and is sequentially varied from
the electrode finger pitch of an electrode finger of the plurality of electrode fingers located at an
end of the first inter-digital transducer that is opposite from the farthest end to gradually
approach the electrode finger pitch of the electrode fingers located near the center of the first
inter-digital transducer in the range from the electrode finger at the farthest end to the electrode-
finger lying at the other end of the gradation region and on the center side of the first inter-digital
transducer.

Claim 7 (Currently Amended) The surface acoustic wave filter of claim 6, ~~wherein~~

wherein the second inter-digital transducer is formed of two electrodes including a plurality of electrode fingers, and the second inter-digital transducer includes has a second gradation region located at opposing ends thereof,

wherein the second gradation region of the second inter-digital transducer includes electrode fingers of the plurality of electrode fingers of the second inter-digital transducer, the electrode fingers included in the second gradation region having where an electrode finger pitch that gradually changes of,

wherein, at each opposing end of the second inter-digital transducer and within the second gradation region, the electrode finger pitch of 5 to 30 electrode fingers of the plurality of electrode fingers at opposite ends is different from an the electrode finger pitch of electrode fingers of the plurality of electrode fingers located near a center of the second inter-digital transducer,

wherein, within the second gradation region, regarding the electrode finger pitches in the gradation region, the electrode finger pitch of the electrode fingers of the plurality of electrode fingers located at the a farthest end, which is one end of the second gradation region and an one of the opposing ends end of the second inter-digital transducer, is set to be 1 through 1% to 5 % smaller than the electrode finger pitch of the electrode fingers located near the center of the second inter-digital transducer, and

wherein, within the second gradation region, the electrode finger pitch is pitches are sequentially varied from the electrode finger pitch of an electrode finger of the plurality of electrode fingers of the second inter-digital transducer located at the farthest end to gradually approach the electrode finger pitch of the electrode fingers located near the center of the second

inter-digital transducer, and is sequentially varied from the electrode finger pitch of an electrode finger of the plurality of electrode fingers of the second inter-digital transducer located at an end of the second inter-digital transducer that is opposite from the farthest end to gradually approach the electrode finger pitch of the electrode fingers located near the center of the second inter-digital transducer in the range from the electrode finger at the farthest end to the electrode finger lying at the other end of the gradation region and on the center side of the second inter-digital transducer.